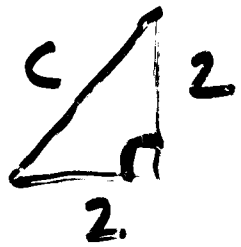
BE-1B | MONDAY 1-8-07

① FIND THE EXACT VALUE OF c,
this means NO CALCULATORS!
MULTIPLE CHOICE, SHOW WORK!!!



(a) $\sqrt{8}$ (b) 2 (c) 4 (d) $2\sqrt{2}$

$$c^2 = a^2 + b^2$$

$$c^2 = (2)^2 + (2)^2$$

$$c^2 = 4 + 4$$

$$c^2 = 8$$

$$c = \sqrt{8} = \sqrt{4 \cdot 2} = \sqrt{4} \cdot \sqrt{2}$$

$$= \boxed{2\sqrt{2} = c}$$

Ch. 11-1 (Square Root)

Simplifying Radical Expressions

2 BASIC RULES:

1. DON'T LEAVE ANY "perfect square" FACTORS UNDER THE $\sqrt{\ }$
2. DON'T LEAVE ANY $\sqrt{\ }$ IN THE DENOMINATOR OF A FRACTION (bottom)

Ex 1) $\sqrt{8} = \sqrt{4 \cdot 2} = \sqrt{4}\sqrt{2}$

$= \boxed{2\sqrt{2} = \sqrt{8}}$

↑ Simplified

Ex 2) $\frac{1}{\sqrt{6}} = \frac{1}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \boxed{\frac{\sqrt{6}}{6} = \frac{1}{\sqrt{6}}}$

↑ Simplified

"RATIONALIZE" the denominator

"RADICAL THE BOTTOM"

Useful Rules for simplifying square roots

⇒ Product/Quotient Rules (Mult. / Divide)

EX! P. 56

M.R. ⇒ Ex) $\sqrt{12} = \sqrt{3 \cdot 4} = \sqrt{4} \cdot \sqrt{3}$

$$\Rightarrow \boxed{\sqrt{a \cdot b} = \sqrt{a}\sqrt{b}}$$

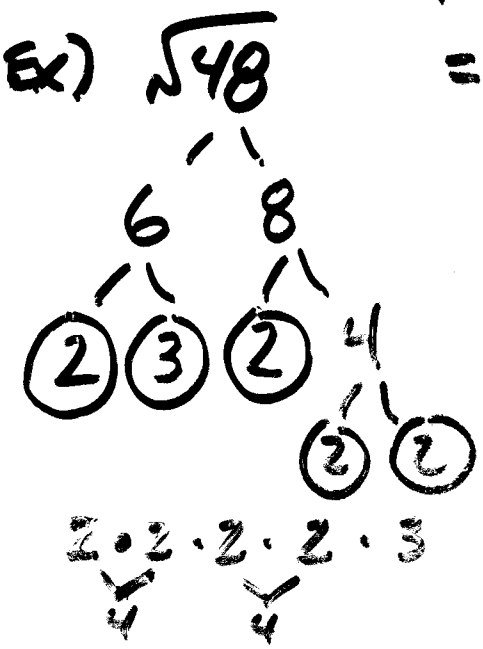
D.R. ⇒ Ex) $\sqrt{\frac{49}{4}} = \frac{\sqrt{49}}{\sqrt{4}} = \frac{7}{2}$

$$\Rightarrow \boxed{\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}}$$

Use A Prime Factorization (Factor tree) to find any perfect square factors

Ex) $\sqrt{48} = \sqrt{16}\sqrt{3}$

$$\boxed{4\sqrt{3}}$$



Ex Simplify

(A) $\sqrt{50}$

(B) $\sqrt{72}$

(C) $\sqrt{90}$

If you have 2 square roots being multiplied - use the M.R. to combine them & then check for any perfect square factors:

Ex 2 Pg 587 Simplify $\sqrt{3} \cdot \sqrt{15}$

$\sqrt{3}$ simplified
$\sqrt{15}$ simplified

$= \sqrt{3 \cdot 15} = \sqrt{45}$

$= \sqrt{9 \cdot 5}$

$= \boxed{3\sqrt{5}}$

Or $\sqrt{3} \cdot \sqrt{15}$

$= \sqrt{3} \cdot \sqrt{3}\sqrt{5}$

$\boxed{3\sqrt{5}}$

2 RULES ⇒ • No PS under $\sqrt{}$
• NO $\sqrt{}$ in denominator

How to "RATIONALIZE the denominator"

(EX) $\dfrac{1}{\sqrt{3}} = \dfrac{1}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} = \boxed{\dfrac{\sqrt{3}}{3}}$

NOT SIMPLIFIED
≈ 0.577

SIMPLIFIED
≈ 0.577

(EX) $\dfrac{\sqrt{10}}{\sqrt{3}} = \dfrac{\sqrt{10}}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} = \boxed{\dfrac{\sqrt{30}}{3}}$

No $\sqrt{}$ in bottom also means NO fraction under $\sqrt{}$. Why

(EX) $\sqrt{\dfrac{1}{2}} = \dfrac{\sqrt{1}}{\sqrt{2}} = \dfrac{1}{\sqrt{2}}$

NOT SIMPLIFIED

$\therefore \dfrac{1}{\sqrt{2}} \cdot \dfrac{\sqrt{2}}{\sqrt{2}} = \boxed{\dfrac{\sqrt{2}}{2}}$

SIMPLIFIED

Summary ⇒ Simplifying Square Roots

- NO PERFECT SQUARE FACTORS UNDER $\sqrt{\ }$
- NO $\sqrt{\ }$ IN DENOMINATOR, WHICH ALSO MEANS NO FRACTIONS UNDER $\sqrt{\ }$

USE MR/DR (MULT. RULE / DIVISION RULE)

$$\sqrt{ab} = \sqrt{a}\sqrt{b} \qquad \sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

Ex) $\sqrt{44} = \sqrt{4}\sqrt{11}$

$= \boxed{2\sqrt{11}}$

Ex) $\sqrt{\frac{5}{2}} = \frac{\sqrt{5}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \boxed{\frac{\sqrt{10}}{2}}$

Homework:

- Read Ch 11-1
- Pg 589-590 # 4, 5, 10, 15, 16, 18, 19,